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BLUE EYES SENSING INTELLIGENCES TECHNOLOGY USING EMOTION SENSOR

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ABSTRACT

The BLUE EYES technology is like a non-obtrusive sensing method for creating computational machines that have perceptual and sensory ability like those of human beings. This commonly uses most modern video cameras and microphones to identify the user's actions through the use of imparted sensory abilities. It has the ability special techniques like facial recognition, speech recognition, etc. It can even understand your emotions at the touch of the mouse. It verifies your identity, feels your presents, and starts interacting with you.

The user can concentrate on observation and manual operations, and still control the machinery by voice input commands. A Blue Eyes-enabled television could become active when the user makes eye contact, at which point the user could then tell the television to "turn on". Human error is still one of the most frequent causes of all artificial disasters. Today human contribution to the overall performance of the system is left unsupervised. This paper is about the important modules, techniques, methodizes and relevance updating technologies in the "blue eye".

KEYWORDS: Perceptual, Blue Eyes, Recognition, Artificial

INTRODUCTION

The "BLUE EYES" technology aims at creating computational machines that have perceptual and sensory ability like those of human beings. How can we make computers "see" and "feel"? Blue Eyes uses sensing technology to identify a user's actions and to extract key information. This information is then analyzed to determine the user's physical, emotional, or informational state, which in turn can be used to help make the user more productive by performing expected actions or by providing expected information. Human cognition depends primarily on the ability to perceive, interpret, and integrate audio-visuals and sensoring information. Adding extraordinary perceptual abilities to computers would enable computers to work together with human beings as intimate partners. Researchers are attempting to add more capabilities to computers that will allow them to interact like humans, recognize human presents, talk, listen, or even guess their feelings. Blue eyes system monitors the status of the operator's visual attention through measurement of saccadic activity. The system checks parameters like heart beat rate and Blood oxygenation against abnormal and triggers user defined alarms.

It can even understand your emotions at the touch of the mouse. It verifies your identity, feels your presents, and starts interacting with you .You asks the computer to dial to your friend at his office. It realizes the urgency of the situation through the mouse, dials your friend at his office, and establishes a connection.

Figure 1: Blue Eyes

WHAT IS BLUE EYES TECHNOLOGY?

Aims at creating computational machines that have perceptual and sensory ability. Use camera and microphone to identify user actions and emotions Blue Eyes – Bluetooth technology and the movements of the eyes. Bluetooth provides reliable wireless communication. As the eye movements enable us to obtain a lot of Interesting and important information. This required designing a Personal Area Network linking all the operators and the Supervising system.

For example, a Blue Eyes-enabled television could become active when the user makes eye contact, at point the user could then tell the television to "turn on".

WHY BLUEEYES?

Human error is still one of the most frequent causes of all artificial disasters. Today human contribution to the overall performance of the system is left unsupervised. Since the system is made to perform automatically, an operator becomes a passive observer of the supervised system, which causes drop to awareness. It therefore is crucial to assure that the operator's conscious brain is involved in an active system which will supervise over the whole work time period. It is possible to measure indirectly the level of the operator's conscious brain involvement using eye movement analysis. In large control rooms, wiring the operator to the central system is a serious limitation of his mobility and disables his operation. The wireless link between the sensors worn by the operator and the supervising system offers new way to system overall reliability and safety.

- To built a machine that can understand your emotions
- A pc that can listen, talk or scream
- Verify your identity, feels your presence and interact with you.

The Overall System Diagram is as Follows

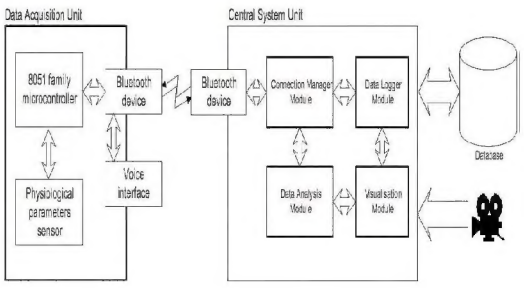

Figure 2: The Overall System Diagram is as Follows

TECHNOLOGIES USED

- Emotion Mouse
- Manual And Gaze Input Cascaded (MAGIC)
- Artificial Intelligent Speech Recognition
- Simple User Interest Tracker (SUITOR)
- The eye movement Sensor

Types of Emotion Sensors

- **For Hand**
  - Emotion Mouse
  - Sentic Mouse
- **For Eyes**
  - Expression Glasses
  - Magic Pointing
  - Eye Tracking
- **For Voice**
  - Artificial Intelligence Speech Recognition

Emotion Mouse

Rosalind Picard (1997) describes why emotions are important to the computing community. There are two aspects of affective computing: giving the computer the ability to detect emotions and giving the computer the ability to express emotions. Not only are emotions crucial for rational decision making as Picard describes, but emotion detection is an important step to an adaptive computer system. An adaptive, smart computer system has been driving our efforts to detect a person's emotional state. An important element of incorporating emotion into computing is for productivity for a computer user. A study (Dryer & Horowitz, 1997) has shown that people with personalities that are similar or complement each other collaborate well.

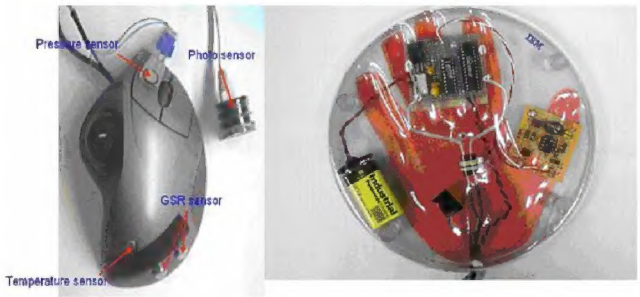

Figure 3: Emotion Mouse

- Simplest way
- People spend approximately
- 1/3 of their total computer
- Time touching input device
- Physiological data is
- Obtained and emotional
- State is determined
- A user model will be
- Built that reflects the
- Personality of user.

Samples Obtained from Emotional Mouse

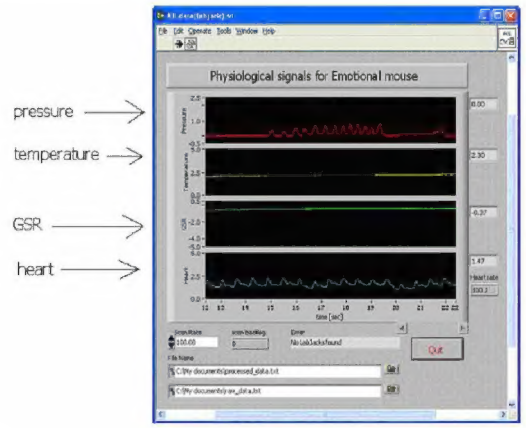

Figure 4: Samples Obtained from Emotional Mouse

Expression Glasses

A wearable device which allows any viewer to visualize the confusion and interest levels of the wearer. Other recent developments in related technology are the attempt to learn the needs of the user just by following the interaction between the user and the computer in order to know what he/she is interested in at any given moment.

Figure 5: Expression Glasses

For example, by remembering the type of websites that the user links to according to the mood and time of the day, the computer could search on related sites and suggest the results the user.

MANUAL AND GAZE INPUT CASCADED (MAGIC)

Reduce the cursor movement needed for target selection Click on the target with a regular manual input device

- Two magic pointing techniques
  - Liberal
  - Conservative

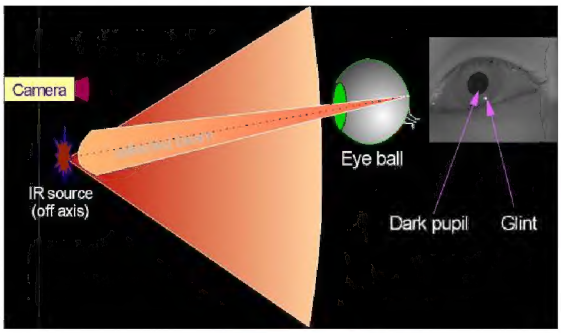

Figure 6: Manual and Gaze Input Cascaded (MAGIC)

The liberal MAGIC pointing technique: cursor is placed in the vicinity of a target that the user fixates on. Actuate input device, observe the cursor position and decide in which direction to steer the cursor. The cost to this method is the increased manual movement amplitude. The conservative MAGIC pointing technique with "intelligent offset" To initiate a pointing trial, there are two strategies available to the user. One is to follow "virtual inertia:" move from the cursor's current position towards the new target the user is looking at. This is likely the strategy the user will employ, due to the way the user interacts with today's interface. The alternative strategy, which may be more advantageous but takes time to learn, is to ignore the previous cursor position and make a motion which is most convenient and least effortful to the user for a given input device.

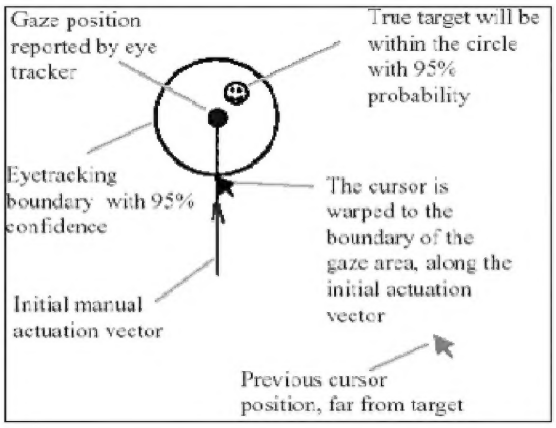

Figure 7: Manual and Gaze Input Cascaded

APPROACHES

Liberal Approach

To warp the cursor to every new object user looks at

Conservative Approach

Does not warp the cursor target until

ARTIFICIAL INTELLIGENT SPEECH RECOGNITION

Artificial intelligence (AI) involves two basic ideas. First, it involves studying the thought processes of human beings. Second, it deals with representing those processes via machines (like computers, robots, etc). AI is behavior of a machine, which, if performed by a human being, would be called intelligent. It makes machines smarter and more useful, and is less expensive than natural intelligence. Natural language processing (NLP) refers to artificial intelligence methods of communicating with a computer in a natural language like English. The main objective of a NLP program is to understand input and initiate action. The input words are scanned and matched against internally stored known words. Identification of a key word causes in some action to be taken. In this way, one can communicate with the computer one's language. No special commands or computer language are required. There is no need to enter programs in a special language for creating software.

Application of Artificial Intelligent Speech Recognition

- To control weapons by voice commands
- Pilot give commands to computers by speaking into microphones
- Can be connected to word processors and instead of writing, simply dictate to them

SIMPLE USER INTEREST TRACKER (SUITOR)

Help by fetching more information at desktop Notice where the user's eyes focus on the screen fills a scrolling ticker on a computer screen with information related to user's task ex. If reading headline, pops up the story in the browser window

The Eye Movement Sensor Designing

A personal area network for linking all the operators and the supervising system

Two major units

- DAU (Data Acquisition Unit)
- CSU (Central System Unit)

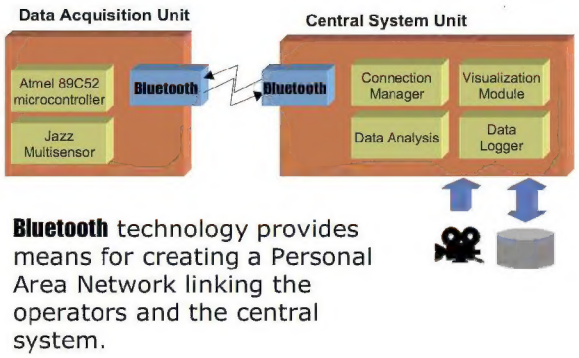

Figure 8: The Eye Movement Sensor Designing

DAU (DATA ACQUISITION UNIT)

- The DAU consists of the following components
- ATMEL 8952 microcontroller
- BLUE TOOTH MODULE – supports synchronous voice
- Data transmission
- Central system sound feedback
- Microcontroller (115200 bps)
- ALPHAUNUMERIC LCD display
- LED indicators
- ID CARD interface

Data Acquisition Unit is a mobile part of the Blue eyes system. Its main task is to fetch the hysiological data from the sensor and to send it to the central system to be processed. To accomplish the task the device must manage wireless Bluetooth connection as (connection establishment, authentication and termination). Personal ID cards and PIN codes provide operator's authorization. Communication with the operator is carried on using a simple 5-key keyboard, a small LCD display and a beeper. When an exceptional situation is detected the device uses them to notify the operator. Voice data is transferred using a small headset, interfaced to the DAU with standard mini-jack plugs.

CSU (Central System Unit)

Central System Unit hardware is the second peer of the wireless connection. The box contains a Bluetooth module (based on ROK101008) and a PCM codec for voice data transmission. The module is interfaced to a PC using a parallel, serial and USB cable. The audio data is accessible through standard mini-jack sockets to program operator's personal ID cards we developed a simple programming device. The programmer is interfaced to a PC using serial and PS/2 (power source) ports. Inside, there is Atmel 89C2051 microcontroller, which handles UART transmission and I2C EEPROM (ID card) programming.

CSU – Component

- **Connection Manager**: Main task to perform low-level blue tooth communication

- **Data Analysis Module:** Performs the analysis of the raw sensor data
- **Data Logger Module:** Provides support for storing the monitored data.
- **Visualization Module:** Provides user interface for the supervisors

CSU Features

- Connection management
- Data processing
- Data recording
- Access verification
- System maintenance

Future Improvements

DAU

Small CMOS camera to monitor the operator's point of gaze single PCB (SMD technology) low voltage ICs

CSU

Data mining algorithms advanced data- base encryption using

THE EYE MOVEMENT SENSOR

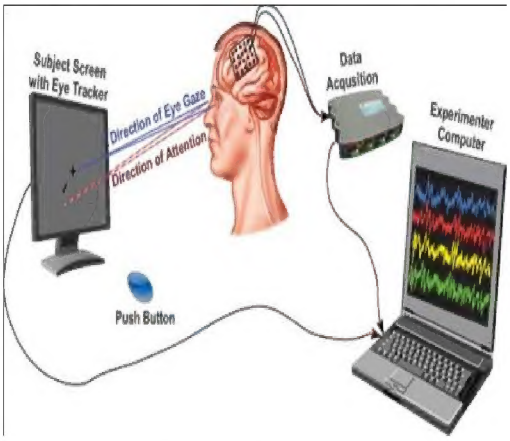

Figure 9: The Eye Movement Sensor

Eye tracking is the process of measuring either the point of gaze (where one is looking) or the motion of an eye relative to the head. An **eye tracker** is a device for measuring eye positions and eye movement. Eye trackers are used in research on the visual system in psychology, in cognitive linguistics and in product design. There are a number of methods for measuring eye movement. The most popular variant uses video images from which the eye position is extracted. Other methods use search coils or are based on the electrooculogram.

BLUE EYES ENABLED DEVICES

POD

Technology Used in Cars

Figure 10: POD

PONG

A Robot

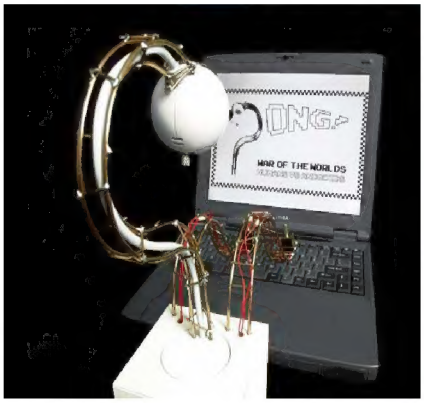

Figure 11: PONG

LIMITATIONS AND FUTURE ASPECTS

The prototype has several limitations, which are not the result of the project deficiency but are rather caused by the constraints imposed by the Project Kit and small budget.

The unique feature of system relies on the possibility of monitoring the operator's higher brain functions involved in the acquisition of the information from the visual environment. The new possibilities can cover such areas as industry, transportation (by air, by road and by sea), military command centers or operating theaters (anesthesiologists). It is intended that the system in its commercial release will help avoid potential threats resulting from human errors, such as weariness, oversight, tiredness

APPLICATIONS

- In retailing record and interpret customer movements
- In automobile industry

- In video games
- To create "Face Responsive Display" and "Perceptive Environment" Generic control rooms
- Power station
- Flight control centres
- Operating theatres

CONCLUSIONS

Human has tremendous expectations from human being's future and present. This tends to research new and helpful technologies which can make the life more comfortable and reliable. This technology is one of them that can make so. Artificial disasters due to consciousness of human brain can be overcome from those accidents.

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